

IN THE CLAIMS:

Claims 1-25 (Cancelled).

26. (New) A protein, sulfiredoxin (Srx), which comprises at least one catalytic site having a motif: FXGCHR, wherein X is G or S.

27. (New) The protein of claim 26, having a molecular weight of about 8 to 14kDa.

28. (New) The protein of claim 26, which is a sulfiredoxin of a microorganism, plant or higher organism, which comprises between about 80 and 170 amino acids and at least the one catalytic site having the motif: FXGCHR, wherein X is G or S, and having the following percentage identities and similarities:

yeast/human: 32% identity and 67% similarity

yeast/plants: 23% identity and 39% similarity

yeast/mouse: 31% identity and 51% similarity

yeast/fungi: 80% identity and 9% similarity.

29. (New) The protein of claim 26, which is selected from proteins having sequences corresponding to SEQ. ID. Nos. 1-10.

30. (New) The protein of claim 26, which is from yeast and is Srx1, having a molecular weight of 13kDa.

31. (New) The protein of claim 26, which is from humans and is hSrx1, having a molecular weight of 13.6kDa.

32. (New) A protein which catalyzes reduction of Cys-SO₂H groups.
33. (New) The protein of claim 32, which catalyzes reduction of peroxyredoxin (Prx) in a superoxide (Cys-SO₂H) form to a corresponding thiol form.
34. (New) An isolated peptide corresponding to the catalytic site of Srx as defined in claim 26.
35. (New) A pharmaceutical composition, comprising an amount of a protein comprising a sequence selected from the group consisting of SEQ ID Nos. 1-3 and 5-10 and at least one pharmaceutically acceptable excipient, said protein amount being effective for testing a disorder arising from a defect in a Prx/Srx antioxidizing system in a mammal.
36. (New) A method of screening for disease by evaluating involvement of a Prx/Srx antioxidizing system, which comprises the steps of:
- (a) bringing cells of a biological sample into contact, in vitro, with hydrogen peroxide (H₂O₂),
 - (b) detecting Prx-Cys_p-SO₂H formed, between about 1 hour and 4 hours after step (1),
and
 - (c) establishing a ratio of amounts of Prx-Cys_p-SO₂H and of Prx-Cys_p-SH, from about 4 hours after step (1).

37. (New) The method of claim 36, wherein the disease is cancer.
38. (New) The method of claim 36, wherein the disease is a neurodegenerative disease.
39. (New) The method of claim 36, wherein the disease is aging.
40. (New) A method of screening for disease by genotyping of sulfiredoxin, using total RNA of a biological sample, which comprises the steps of:
- (a) extracting the total RNA from the biological sample,
 - (b) preparing specific sulfiredoxin cDNA by amplification of the RNA using the following two primers:

GTCCCGCGGCGGCGGCGACG (SEQ ID No. 11)
AGCAGGTGCCAAGGAGGCTG (SEQ ID No. 12),

these sequences being located, respectively, upstream and downstream of the human sulfiredoxin ORE' (GenBank No. AAH47707),
 - (c) establishing its nucleotide sequence, and
 - (d) comparing with respect to a DNA sequence encoding an Srx protein, as defined above, derived from the same species as that of the biological sample to be analyzed.
41. (New) The method of claim 40, wherein the disease is cancer.

42. (New) The method of claim 40, wherein the disease is a neurodegenerative disease.

43. (New) The method of claim 40, wherein the disease is aging.

44. (New) A method of screening for diseases which entails relative quantification of the mRNA encoding sulfiredoxin from a total cDNA prepared from a human biological sample, by comparison with a reference sample.

45. (New) The method of claim 44, wherein the quantification comprises the steps of:

- (a1) preparing cDNA from the total RNA by reverse transcription with appropriate primers, and in particular random hexanucleotide primers;
- (a2) amplifying said cDNA in the presence of the pair of primers:
GTCCCGCGGCGGCGGCGACG (SEQ ID No. 11)
AGCAGGTGCCMGGAGGCTG (SEQ ID No. 12),
in the presence of a fluorescent reporter, and simultaneously or sequentially,
- (a3) detecting the amount of the amplimer (or amplicon) by measuring the fluorescent signal.

46. (New) The method of claim 45, wherein the disease is cancer.

47. (New) The method of claim 45, wherein the disease is a neurodegenerative disease.

48. (New) The method of claim 45, wherein the disease is aging.

49. (New) The method of claim 45, wherein the fluorescent reporter is selected from the group consisting of agents that bind to double-stranded DNA and fluorescent probes.

50. (New) The method of claim 45, wherein when said fluorescent reporter is a probe, it is selected from the group consisting of the probes defined by the following sequences:

TTAATTGAATTCATGGGGCTGCGTGCAGGAGG (SEQ ID No. 13) and

TTTTCCTTTTGCGGCCGCCTACTACTGCAAGTCTGGTGTGGATG (SEQ ID No. 14).

51. (New) A method of screening for disease which comprises the steps of:

a) immunodetecting an Srx protein in a biological sample, using an antibody obtained by immunization of an animal with an Srx protein or the peptide FXGCHR, with X = G or S, after separating total proteins by electrophoresis, and then

b) evaluating quality and amount of the Srx protein compared with a control Srx protein.

52. (New) The method of claim 51, wherein the disease is cancer.

53. (New) The method of claim 51, wherein the disease is neurodegenerative disease.

54. (New) The method claim claim 51, wherein the disease is aging.

55. (New) A method of obtaining plants having an increased stress resistance, which comprises evaluating a Prx/Srx antioxidizing system of a plant using the protein of claim 26, and selecting a plant based upon the evaluation.

56. (New) A host cell transformed with a recombinant vector comprising a sequence encoding an Srx protein, defined by a sequence selected from the group consisting of the sequences SEQ ID Nos. 1-3, 5, 6 and 8-10.

57. (New) The host cell of claim 56, which is an *S. cerevisiae* strain modified with a vector overexpressing the Srx1 gene.

58. (New) The host cell of claim 56, which is a mammalian cell modified with a vector overexpressing the hSrx1 gene.

59. (New) The host cell of claim 56, wherein the vector is an *E. coli*/*S. cerevisiae* shuttle vector comprising, at an EcoRI cloning site, a sequence encoding the Srx protein and the promoter of the Srx gene.

60. (New) A method of screening for medicinal products capable of modulating activity of a Prx/Srx antioxidizing system, which comprises the steps of:

(a) bringing a sample substance into contact with the host cells of claim 41, in the presence of hydrogen peroxide,

(b) detecting Prx-Cys formed, between about 1 hour and 4 hours after step 1), and,

(c) establishing a ratio of amounts of Prx-Cys and of Prx-Cys from about 4 hours after step 1).

61. (New) A method of screening for medicinal products for treating a condition arising from a fault in a Prx/Srx antioxidizing system, which comprises the steps of:

a) bringing a sample substance into contact with an extract of the host cells of claim 41, or a biological sample of a nonhuman transgenic animal selected from the group consisting of animals in which the gene of the Srx protein is knocked out and animals in which a gene of the Srx protein is overexpressed, in the presence of hydrogen peroxide,

b) measuring an antioxidizing activity of the Prx/Srx system of the mixture obtained in a), and

c) selecting the substances capable of stimulating or of inhibiting said activity.

62. (New) The method of claim 61, wherein the measurement of said activity is carried out by detecting the Prx-Cys_p-SO₂H formed, between about 1 hour and 4 hours after said bringing into contact according to step (a), and establishing the ratio of the amounts of Prx-Cys_p-SO₂H and of Prx-Cys_p-SH, from about 4 hours after said bringing into contact according to step (a).

63. (New) A method of screening for medicinal products, for treating a condition related to a fault in a Prx/Srx antioxidizing system, which comprises the steps of:

(a) bringing a sample substance into contact with nonhuman transgenic mammals selected from the group consisting of animals in which the gene of the Srx protein is knocked out and animals in which the gene of the Srx protein is overexpressed, and

(b) measuring survival of the animal.

64. (New) Anti-Srx antibodies, obtained by immunization of an animal with an Srx protein defined by a sequence selected from the group consisting of the sequences SEQ ID No. 1-3, 5, 6 and 8-10 or the peptide FXGCHR, with X = S, as claimed in claim 34.

65. (New) The anti-Srx antibodies of claim 64, which are monoclonal antibodies.

66. (New) The anti-Srx antibodies of claim 64, which are polyclonal antibodies.

67. (New) A method of reducing a product comprising at least two cysteines with redox activity, which comprises the step of bringing said protein into contact with a sulfiredoxin (Srx), as defined in claim 26, which comprises at least one catalytic site having the following motif: FXGCHR, with X = G or S, in the presence of ATP and magnesium.

68. (New) A method of synthesizing a product comprising Cys-SH residues from products comprising Cys-SO₂H residues, which comprises the step of reducing the product comprising the Cys-SO₂H residues to a product comprising Cys-SH residues, in the presence of a sulfiredoxin as defined in claim 26, ATP and magnesium.